International Scientific Journal of Engineering and Management (ISJEM)
Volume: 05 Issue: 04 | April – 2026
An International Scholarly || Multidisciplinary || Open Access || Indexing in all major Database & Metadata
ISSN: 2583-6129
DOI:10.55041/ISJEM06923

A Study on Risk and Return Analysis of Selected Stocks at the Seven Pounds

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Abstract: The goal of this study is to utilize Python to create and assess an ideal investing portfolio using Harry Markowitz's Modern Portfolio Theory (MPT). The primary goal is to determine a portfolio that maximizes returns while reducing risk through diversification by analysing the link between risk and return. The study makes use of historical stock price information from businesses in several industries that are listed on the National Stock Exchange (NSE). Portfolio performance was evaluated using statistical metrics such variance-covariance matrix, standard deviation, anticipated return, and Sharpe ratio. The findings demonstrate that adding a risk-free asset, such as Government of India assets, increases portfolio stability while diversity lowers risk. All things considered, the ideal portfolio offers managed risk and balanced returns, making it appropriate for investors who are somewhat risk adverse.

***Key Words*:** Modern Portfolio Theory (MPT), Portfolio Optimization, Risk–Return Analysis, Diversification, Efficient Frontier, Sharpe Ratio, Python in Finance, NSE, Risk-Free Asset, Financial Modelling.

INTRODUCTION

The stock market has grown in popularity as an investment choice in the modern world because of easier access to online trading platforms and greater financial awareness. The stock market offers a bigger potential return but also carries risk because of market fluctuations, in contrast to traditional assets like gold and fixed deposits, which offer steady but constrained returns. As a result, investors must balance risk and return using a scientific method. By distributing investments among several assets, diversification and portfolio management can lower risk. Harry Markowitz developed Modern Portfolio Theory (MPT), which offers a methodical approach to choosing the optimal asset mix based on risk and projected return. The efficient frontier, variance, standard deviation, covariance, and other concepts aid investors in determining the best portfolios.

Financial analysis is now quicker and more precise thanks to technical breakthroughs like Python and its libraries (NumPy, Pandas, Matplotlib). This study demonstrates how investors can create effective portfolios, successfully manage risk, and improve long-term financial stability by fusing financial theory with technology.

NEED OF THE STUDY

- The course focuses on building portfolios using the Markowitz Modern Portfolio Theory and the Python programming language.
- It examines how risk and return are related and describes how diversification lowers overall portfolio risk.
- The study computes anticipated returns, variance, and covariance among chosen equities using historical stock market data.
- Portfolio optimization and the creation of effective frontier graphs for determining the ideal portfolio are carried out using Python tools and packages.
- The study primarily concentrates on quantitative analysis rather than qualitative market characteristics and is restricted to a particular time period and a subset of equities.

OBJECTIVES OF THE STUDY

- To calculate the expected return of selected stocks.
- To measure the risk of selected stocks.
- To Construct an optimal portfolio using Markowitz.
- portfolio.
- To include a risk-free asset in the portfolio analysis.
- To evaluate portfolio performance using the Sharpe ratio.
- To identify the optimal portfolio using the Efficient portfolio by python theory.

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SCOPE OF THE STUDY

- The subject focuses on building portfolios usin g Harry

Markowitz's Modern Portfolio Theory.

- It examines how diversification lowers investm ent risk

and raises expected returns.

- The study makes use of historical stock price in formation from certain NSE and BSE-listed companies.
- The ideal portfolio and efficient frontier are fou nd using

quantitative techniques including return, risk, covarianc e, and correlation.

REVIEW OF LITERATURE

Tongyu Wu, (2026) "A Review of Markowitz Portfolio Theory Based on the Application of Python in Financial Risk Management"

Harry Markowitz's investment theory focuses on portfolio diversification to reduce risk and maximize returns through optimal asset allocation. In the big data era, Python enables faster and more accurate analysis of real market data using this model. By calculating expected returns, standard deviation, Sharpe ratio, and plotting the efficient frontier, Python helps identify the portfolio with the highest return for a given level of risk. Overall, applying Python to the Markowitz model enhances quantitative analysis, supports better investment decisions, and strengthens risk management.

Guilherme Pires, Peter Wanke, Jorge Antunes, Yong Tan, Nickolaos G, (2026) "Portfolio optimization with minimum assets and dividend yield constraints"

This study develops three portfolio optimization models for FIIs, BDRs, and Brazilian stocks traded on B3, based on Harry Markowitz's theory. The models incorporate advanced constraints such as entropy, mutual information, high-order moments, dividend yield, ticker balancing, and apply the TOPSIS method with entropy-weighted variables.

Suba shun Vikash, Nithya Murali, Subash Rajendran, (2025) "AI-Enhanced Portfolio Optimization Framework Leveraging Modern Portfolio Theory"

The paper presents an AI-enhanced portfolio optimization framework based on Modern Portfolio Theory, introduced by Harry Markowitz. Developed as a Python platform, the system automates portfolio management for both beginners and advanced investors. It integrates real-time data from Yahoo Finance and Alpha Vantage, offering features such as asset monitoring, bond yield analysis, equity tracking, and portfolio optimization. The framework enhances decision-making by combining AI-driven computation with up-to-date market data, improving investment management in volatile markets.

Mitra Madancian, HamedTaherdoost – The impact of Artificial intelligence on Human Resource Management (2024) AI has become a transformative technology in human resource management by improving efficiency in recruitment, on boarding, performance appraisal, and talent management. AI-driven analytics support strategic workforce planning through data-based decision-making. However, literature highlights major challenges such as ethical concerns, algorithmic bias, and the risk of reducing human interaction in employee management. Privacy and security issues are also significant due to the handling of sensitive employee data. Researchers emphasize the need for a balanced approach where AI enhances HRM processes without replacing the human element. Proper collaboration and responsible implementation can ensure fair, productive, and ethical workplaces.

RESEARCH METHODOLOGY

RESEARCH DESIGN

A research design is a systematic and organized framework that describes the steps and techniques for gathering, quantifying, and evaluating data in a study. It acts as a thorough plan that guarantees the study challenge is handled logically, validly, dependably, and impartially.

ANALYTICAL RESEARCH

Analytical research design is a kind of research methodology that examines current data to identify trends, correlations, and patterns. It entails applying quantitative and statistical methods to analyse data and reach significant findings. This strategy aids researchers in comparing outcomes, assessing factors like risk and reward, and using data analysis to make well-informed judgments**.**

DATA COLLECTION

Secondary Data: The data for this study was collected from secondary sources using the Python library yfinance. Historical stock price data from 2022 to 2025 was used for analysis. The selected companies for this study include LT, Titan, SBI, JSW Steel, Bajaj Auto, Eicher Motors, Apollo Hospitals, SBI Life Insurance, and Max Healthcare. These companies were chosen from different sectors to ensure diversification.

SAMPLING METHOD

The study uses non-probability sampling.

SAMPLING TECHNIQUE

Convenience sampling is used in this study where stocks are selected based on availability of data and ease of access. The selected stocks belong to well-known companies with consistent historical data, which helps in accurate analysis.

SAMPLESIZE

The sample size consists of **15 companies** selected from different sectors to ensure diversification. This size is considered suitable for building a balanced portfolio for analysis.

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STATISTICAL TOOLS USED

The gathered information was examined using:

a) Mean (Expected Return)

b) Standard Deviation (Risk)

DATA ANALYSIS

The collected data were analyzed using statistical tools to interpret employee responses.

RESULTS & DISCUSSION

Table 1: Weekly Return of selected stocks

S.NO	STOCKS	TOTAL RETURN PERCENTAGE
1	MAXHEALTH	161.48
2	SBIN	172.56
3	MARUTI	96.32
4	TATASTEEL	102.5
5	JSWSTEEL	112.23
6	EICHERMOT	152.43
7	TITAN	108.23
8	LT	132.31
9	BEL	72.56
10	APOLLOHOSP	98.87
11	GRASIM	0.26
12	BAJAJ-AUTO	152.73
13	SBILIFE	78.22
14	SHRIRAMFIN	34.45
15	TATACONSUM	41.23

The table shows that **State Bank of India** achieved the highest return, followed by **Max Healthcare** and **Bajaj Auto**, indicating strong sector performance.

Table 2: Expected Return of individual stocks

S.NO	STOCKS	RETURN PERCENTAGE
1	MAXHEALTH	0.78
2	SBIN	0.39
3	MARUTI	0.27
4	TATASTEEL	0.26
5	JSWSTEEL	0.28
6	EICHERMOT	0.43
7	TITAN	0.21
8	LT	0.48
9	BEL	0.10
10	APOLLOHOSP	0.30
11	GRASIM	0.26
12	BAJAJ-AUTO	0.72
13	SBILIFE	0.13
14	SHRIRAMFIN	0.68
15	TATACONSUM	0.20

MAXHEALTH.NS recorded the highest weekly return, followed by BAJAJ-AUTO and SHRIRAMFIN. LT and EICHERMOT.NS showed moderate returns, while SBILIFE and BEL had the lowest returns. Overall, most other stocks showed modest performance.

FIG 1: Expected Return of individual stocks

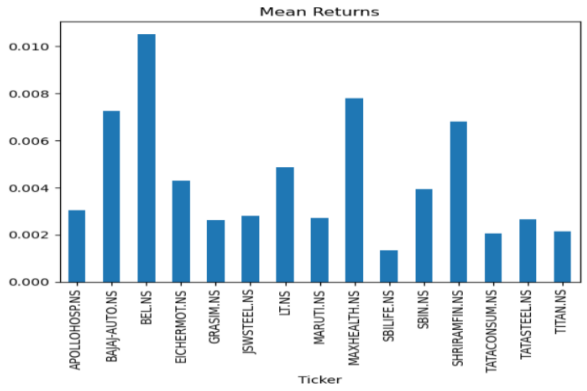

Table 3: Weekly Risk of individual stocks

S.NO	STOCKS	RISK PERCENTAGE
1	MAXHEALTH	4.79
2	SBIN	3.23
3	MARUTI	3.15
4	TATASTEEL	4.18
5	JSWSTEEL	3.56
6	EICHERMOT	3.67
7	TITAN	3.36
8	LT	3.31
9	BEL	4.35
10	APOLLOHOSP	3.41
11	GRASIM	3.21
12	BAJAJ-AUTO	3.56
13	SBILIFE	2.96
14	SHRIRAMFIN	4.10
15	TATACONSUM	3.15

MAXHEALTH.NS and BEL.NS show the highest risk levels, followed by TATASTEEL and SHRIRAMFIN, EICHERMOT, JSWSTEEL, and BAJAJ-AUTO have moderate risk, while SBILIFE has the lowest risk, indicating greater stability.

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FIG 2: Expected Return of individual stocks

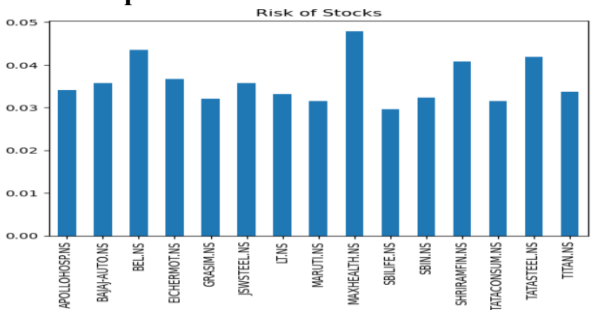
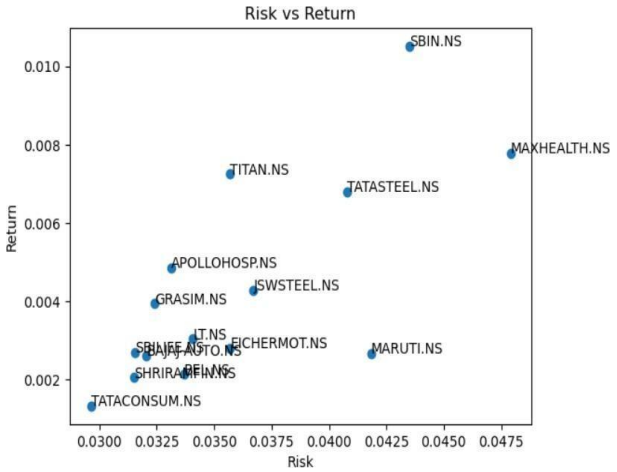


Table 4: Risk vs Return of stocks

S.NO	STOCKS	RISK PERCENTAGE	RETURN PERCENTAGE
1	MAXHEALTH	4.79	0.78
2	SBIN	4.35	1.05
3	MARUTI	4.18	0.27
4	TATASTEEL	4.08	0.68
5	JSWSTEEL	3.67	0.43
6	EICHERMOT	3.57	0.28
7	TITAN	3.56	0.72
8	LT	3.41	0.30
9	BEL	3.37	0.21
10	APOLLOHOSP	3.31	0.49
11	GRASIM	3.24	0.39
12	BAJAJ-AUTO	3.21	0.26
13	SBILIFE	3.16	0.27
14	SHRIRAMFIN	3.15	0.21
15	TATACONSUM	2.96	0.13

SBIN.NS shows the highest return with high risk, MAXHEALTH.NS has good return but the highest risk, and TITAN.NS offers steady return with moderate risk, indicating a balanced performance.

FIG 3: Expected Return of individual stocks



SUGGESTIONS

Concentrate on obtaining improved risk-adjusted returns instead of merely maximizing returns, by balancing high-return yet volatile stocks like Bajaj Auto Limited with steadier performers such as Titan Company Limited to manage overall portfolio risk. Consistently assess investments using metrics such as the Sharpe Ratio to confirm that the returns generated are adequate for the risk assumed. Track portfolio volatility via standard deviation and examine asset relationships utilizing covariance, particularly when incorporating relatively volatile stocks such as Max Healthcare Institute Limited. Furthermore, utilize a risk-free benchmark like the Government of India 10-Year Government Security to assess performance and lessen overall portfolio volatility. In general, controlling risk while aiming for steady returns will result in more stable and effective long-term investment outcomes.

CONCLUSION

The research findings indicate a distinct trade-off between risk and return in the portfolio, as higher-return stocks like Max Healthcare Institute Limited and Bajaj Auto Limited are linked to increased volatility, whereas more stable firms such as Titan Company Limited and SBI Life Insurance Company Limited provide moderate yet steady returns with reduced risk. The total portfolio exhibits a moderate risk–return characteristic, attaining an average return of approximately 0.55% with a risk factor of 2.18%, signifying regulated volatility. The computed Sharpe Ratio of 0.20 indicates that the portfolio produces acceptable returns in relation to the risk involved, although there is potential for enhancing efficiency. The results indicate that striking a proper equilibrium between high-return, volatile assets and stable, low-risk investments is crucial for ensuring reliable and effective long-term performance.

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